

A Cell Model

Membranes

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Cell membrane

controls how easily materials pass into and out of cells

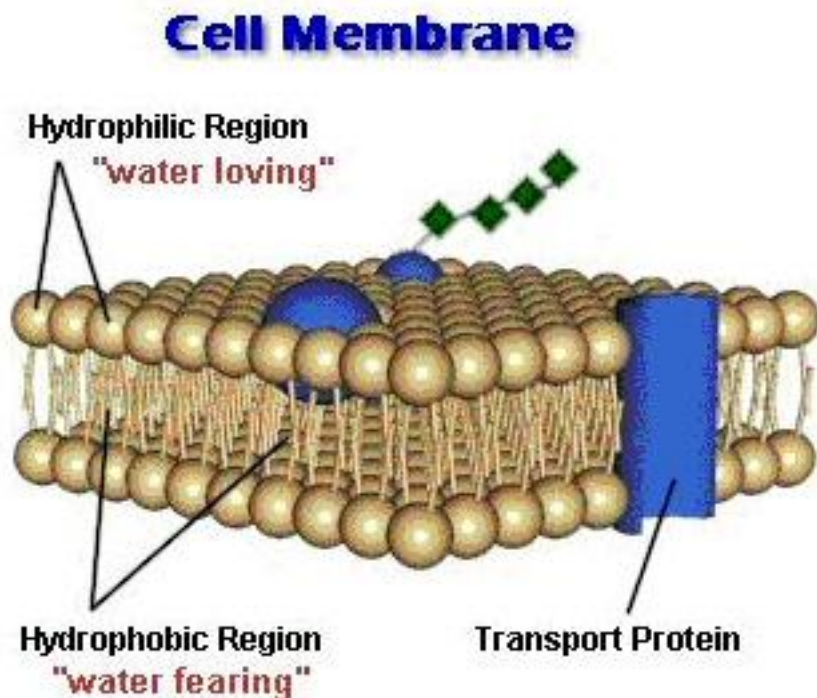
The structure determines what materials can cross the cell membrane

Selectively permeable

allows some materials to cross, but does not allow others to cross

Lipid bilayer

cell membranes are made of a double layer of lipid (fat) molecules



Lipids = fats (do not mix well with water)

The inner and outer layers interact easily with water (*hydrophilic*)

The interior part of the membrane does not interact well with water (*hydrophobic*)

Water soluble

these molecules do not pass easily through the lipid bilayer

EXCEPTION: water molecules pass easily because they are small

****Both sides of the cell membrane are surrounded by water molecules**

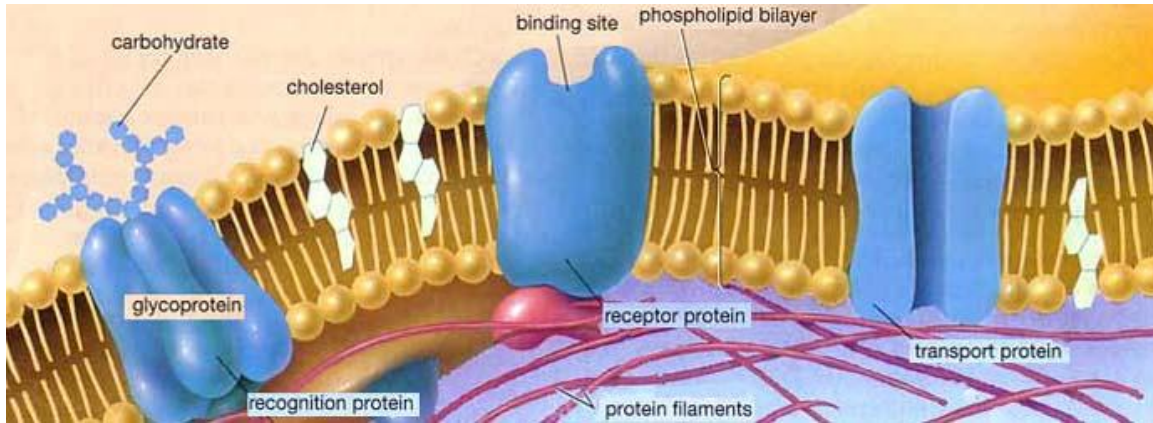
Fat-soluble

these molecules pass easily through the lipid bilayer (lipids)

Transport protein

allows/helps molecules move across the cell membrane

Necessary when molecules are too big to pass through the membrane



<http://www.youtube.com/watch?v=GFCcnxgXOhY>

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Molecular Movement

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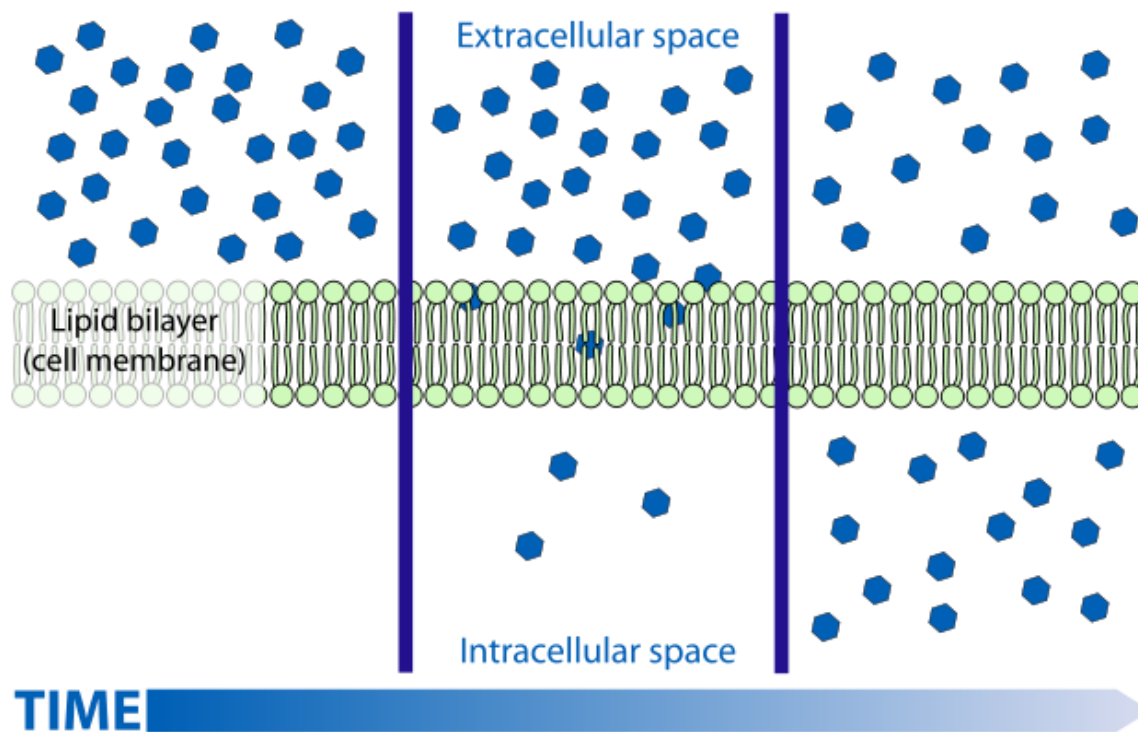
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Diffusion

the movement of molecules from an area of higher concentration to an area of lower concentration

Continues until the concentration of molecules is the same everywhere

NO ENERGY is required



<http://www.brainpop.com/science/matterandchemistry/diffusion/>

http://www.google.com/imgres?um=1&hl=en&sa=N&tbo=d&rlz=1T4GGHP_enUS420US421&biw=1366&bih=533&tbm=isch&tbnid=lQj3wtZIMzmGuM:&imgrefurl=http://leavingbio.net/osmosis%2520and%2520diffusion.htm&docid=Nu4H6TjrrU2loM&imgurl=http://leavingbio.net/OSMOSIS%252520AND%252520DIFFUSION_files/image005.gif&w=640&h=480&ei=dlWmUPy2O8XTyAHi-4GYBQ&zoom=1&iact=rc&dur=129&sig=100749726202238402144&page=1&tbnh=138&tbnw=184&start=0&ndsp=14&ved=1t:429,r:1,s:0,i:145&tx=66&ty=66

<http://programs.northlandcollege.edu/biology/biology1111/animations/passive1.swf>


<http://www.wisc-online.com/objects/ViewObject.aspx?ID=ap1903>

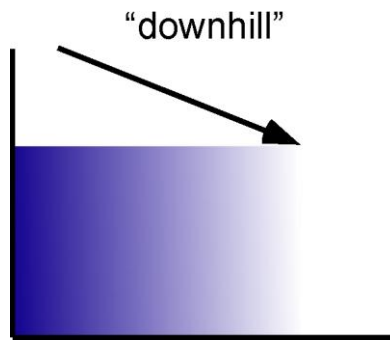
Concentration gradient

a change/difference in the concentration of molecules over a distance

The more crowded the molecules, the more concentrated they are

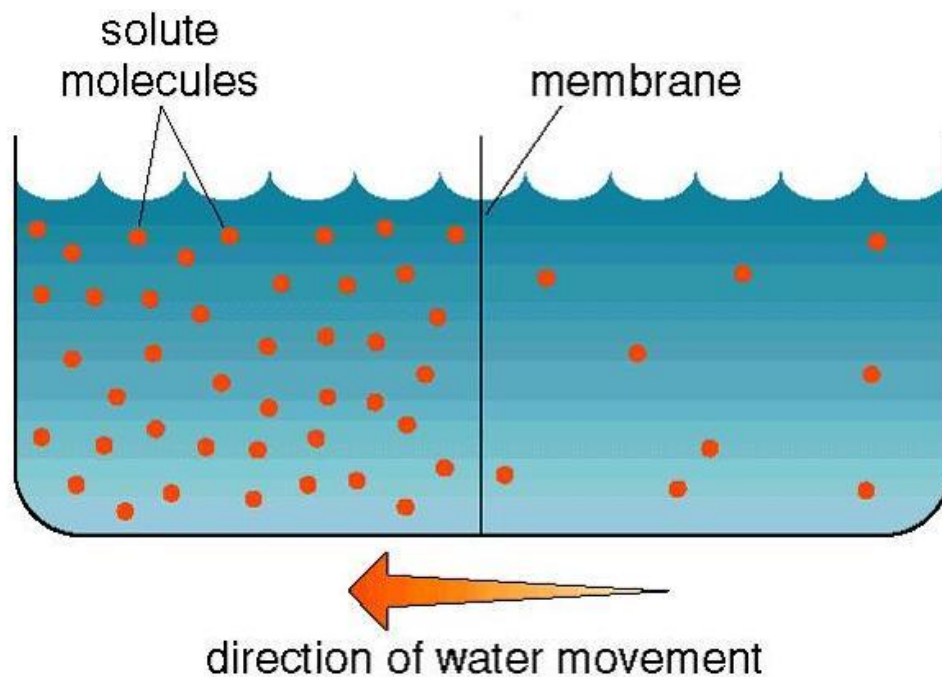
Molecules diffuse from areas of higher concentration to areas of lower concentration

 move *down* the concentration gradient



Osmosis

the movement of water through a membrane from an area of higher concentration to an area of lower concentration



A type of diffusion

Can result in the buildup of pressure inside a cell

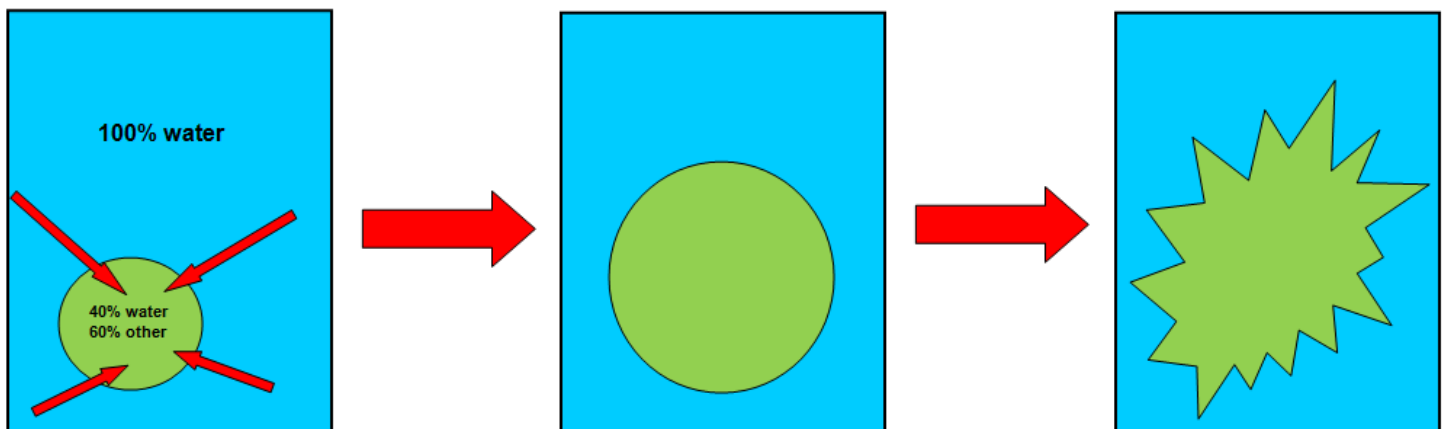
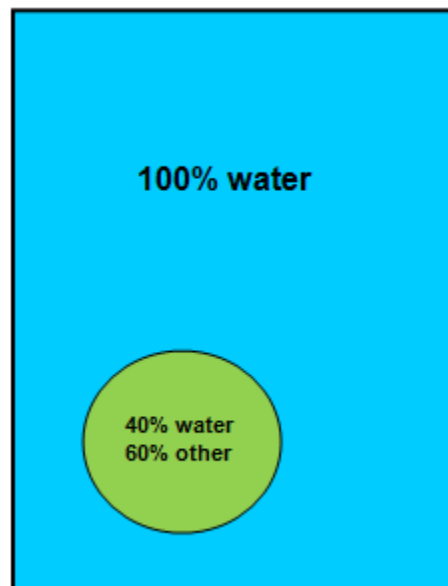
<http://www.stolaf.edu/people/giannini/flashanimat/transport/osmosis.swf>

<http://www.hartnell.edu/tutorials/biology/osmosis.html>

<http://www.uic.edu/classes/bios/bios100/lectures/osmosis.htm>

Example

a cell with 40% water/60% “other stuff”

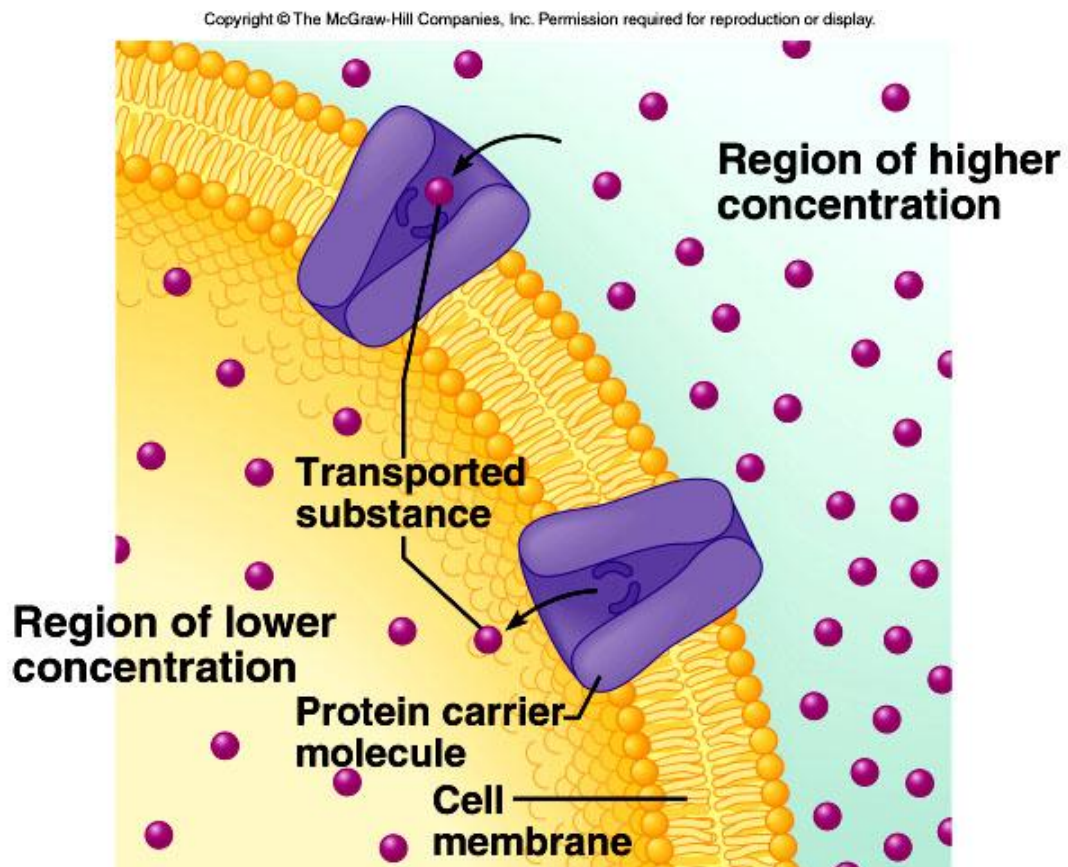
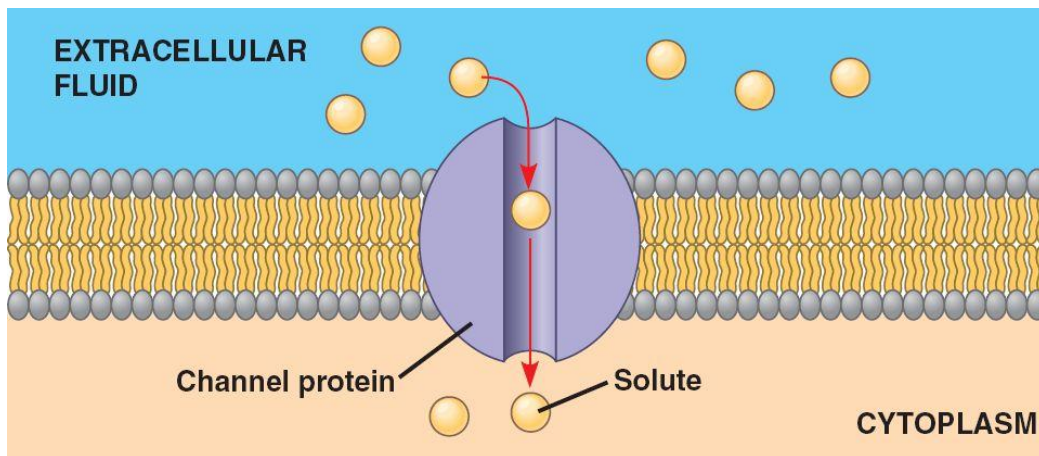


Large molecules/
molecules with
electric charge

cannot cross lipid membranes
easily by diffusion alone

Facilitated diffusion

proteins form channels that allow
substances to move *down* their
concentration gradient into or out
of the cell

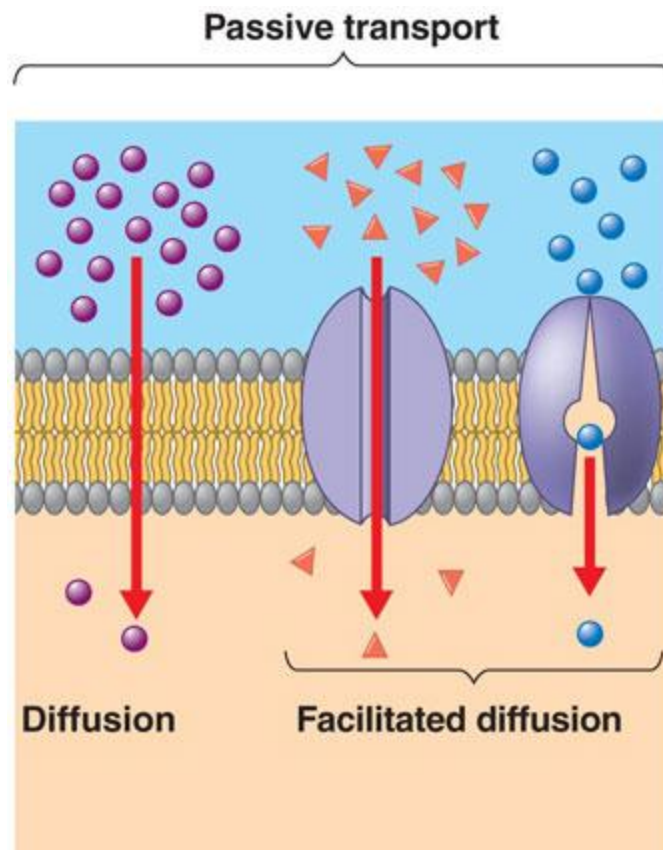


<http://www.northland.cc.mn.us/biology/biology1111/animations/passive3.html>

Passive transport

movement of material across a membrane that does not require energy

- diffusion
- osmosis
- facilitated diffusion

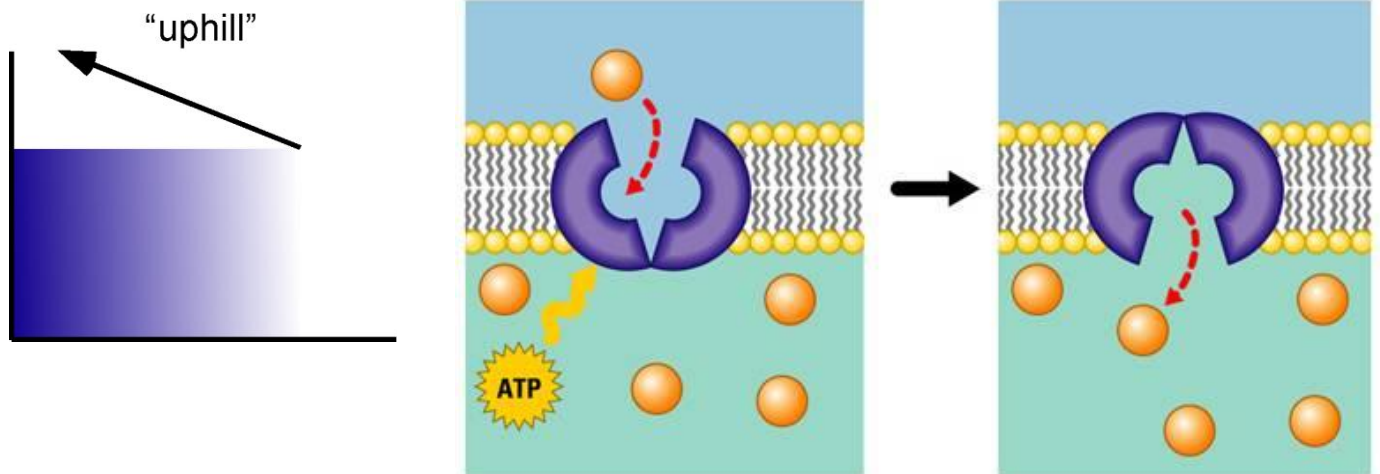


<http://www.brainpop.com/science/cellularlifeandgenetics/passivetransport/>

Active transport

the movement of a substance across a membrane *against/up* the concentration gradient using proteins

ENERGY IS REQUIRED



<http://www.brainpop.com/science/cellularlifeandgenetics/active/transport/>

<http://www.youtube.com/watch?v=STzOiRqzzL4>

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NEED TO KNOW: Cell Model Background Information

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Dialysis tubing	a synthetic (man-made) membrane
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Tiny holes in the tubing allow small molecules to pass through the membrane

Glucose

a simple sugar that dissolves easily in water

Glucose test strips

indicate the presence of glucose in a solution by changing color

Lugol's iodine solution

an indicator that changes color from brown to bluish-black in the presence of starch

Starch

a complex molecule that forms a suspension in water

It turns bluish-black in the presence of Lugol's iodine solution

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Process and Procedures

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